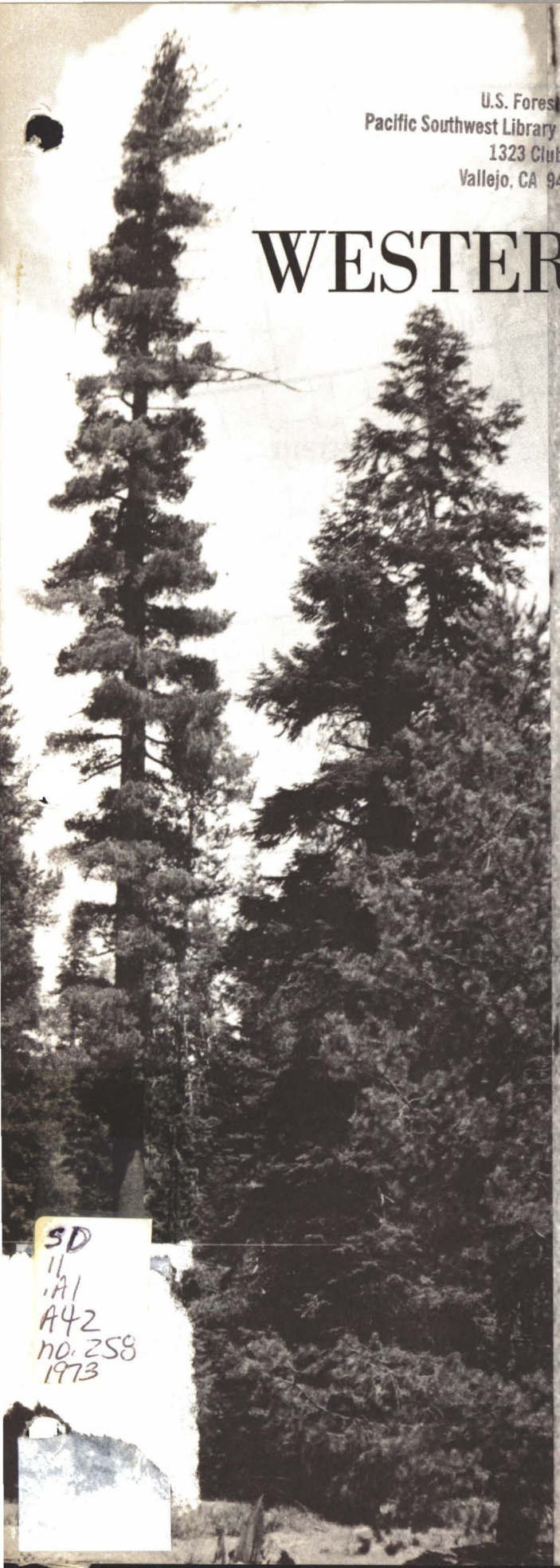
RMO

U.S. Forest Service
Pacific Southwest Library and Information Center
1323 Club Drive
Vallejo, CA 94592-1110



WESTERN WHITE PINE

. . . *an American wood*

Western white pine is "king of the pines" in the Inland Empire, that portion of North Idaho, western Montana, eastern Washington, and interior British Columbia lying between the Pacific coastal ranges and the Rocky Mountains. It is generally the tallest, straightest, and most important commercial species within its range. Its wood has been valued, along with the other white pines, for a great many lumber and related products where light color, ease of working with tools, straightness of grain, and fine texture are especially prized. At one time western white pine was the principal species used for wooden matches. It is now being used extensively for plywood and pulp.

SD
11
.A1
A42
no. 258
1973

FS-258
July 1973
U.S. Department of Agriculture Forest Service

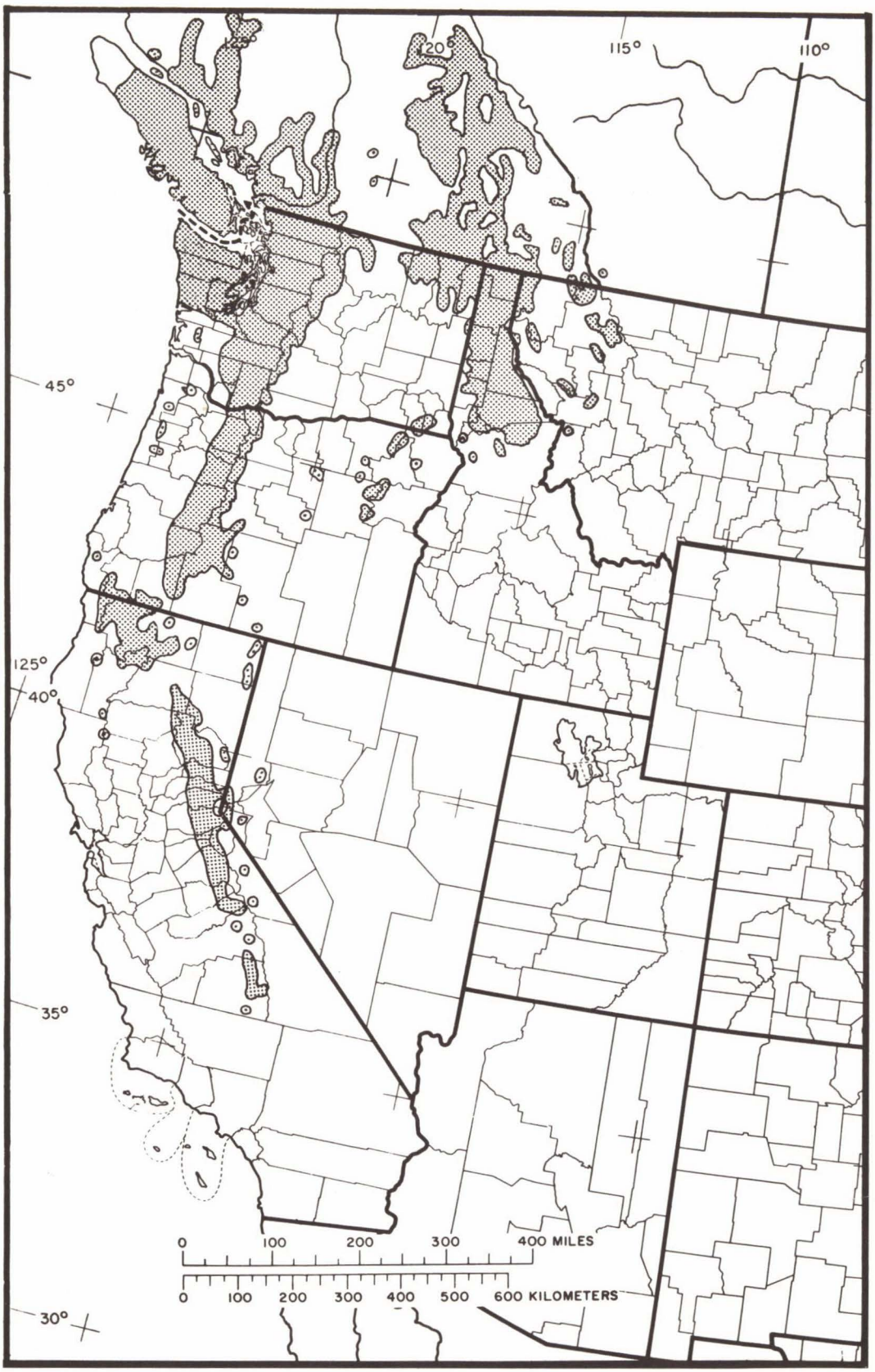


Figure 1.—Natural range of western white pine.

Cover: F-385075

WESTERN WHITE PINE

. . . an American wood

Edward S. Kotak [1]

DISTRIBUTION

Western white pine *(Pinus monticola Dougl.)* grows on west coast mountain ranges from Vancouver Island in British Columbia southward to the southern Sierra Nevada Mountains of California. In the interior its range is from Quesnel Lake in British Columbia southward through the Selkirk Mountains into northern Idaho, western Montana, and northeastern Washington, and also into the Blue Mountains of northeastern Oregon (fig. 1). The species attains its greatest size in northern Idaho and adjacent sections of Montana, Washington, and British Columbia.

Western white pine grows best on deep, well-drained, medium-to-fine-textured soils of high water-holding capacity. In its most northern range it grows from sea level to about 2,500 feet elevation. On Vancouver Island it grows at elevations as high as 5,000 feet. In southern California, its most southern range, it occurs at elevations up to 10,000 feet. Its most important area of occurrence is the Inland Empire at 2,000 to 6,000 feet on steep and broken topography in northern sections and on more gently rolling country in the south. Western white pine grows in mixture with several other conifers and on the average makes up more than 50 percent of the stand volume in natural second-growth stands. Considering all of its associations, it is found as a component in 17 forest cover types.

DESCRIPTION AND GROWTH

Mature western white pines are generally the most impressive trees in the forest. They have tall, slightly tapering stems that are free of limbs up to as much as 100 feet and with generally symmetrical and somewhat open crowns. On good-to-excellent sites, this species often reaches heights of 200 feet or more. The present record tree, growing in North Idaho, has a diameter of 81 inches (measured at breast height) and a total height of 219 feet. The species is long-lived, frequently reaching ages of 300 to 400 years with occasional trees as old as 500 years. The oldest western white pine on record is 615 years old.

The needles of western white pine are blue green, about 3 inches long and grow in clusters of five. Their distinctive color generally sets the species off from others. The cones are about 8 inches long, narrow, and hang distinctively pendant from the limbs (fig. 2).

F-308991

Figure 2.—Needles and cones of western white pine.

The bark on young trees is smooth and gray green and turns dark gray to purplish gray on older trees. In old trees the bark breaks up into alligator-like squares with deep fissures (fig. 3).

[1] Chief, Structural and Forest Systems, Engineering Research, USDA Forest Service, Washington, D.C.

NOTE: This publication supersedes unnumbered publication *Western White Pine,* issued 1954.

F-208109

Figure 3.—Bark of western white pine.

The root system of western white pine is generally fully developed with both taproot and lateral-root systems. This makes the species generally windfirm.

In most growing sites some seed is produced every year. Trees as young as 10 years of age can produce cones, but abundant cone production generally occurs after 40 years of age. Good cone crops occur every third or fourth year. Seed dissemination occurs between late August or early September. By the end of October about 85 percent of the seed has fallen. Seed flight varies with topography and winds, but most of the seed fall in an area within 400 feet of the source. The seed usually germinate in the spring in soils saturated by melting snow.

Stands of the western white pine type are typically even-aged and the species can be regenerated readily under seedtree, shelterwood, or clearcut methods of harvesting. The stands usually are not only very dense, but also contain a broad mixture of intolerant and tolerant species.

COMMON NAMES

Western white pine is often called Idaho white pine or white pine. It is infrequnetly called silver pine. The lumber derived from this species is often called Idaho white pine in the trade.

RELATED COMMERCIAL SPECIES

Because of its valuable properties, western white pine is inventoried by itself in forest statistics. In considering the western white pine timber type, however, only those stands containing a plurality of sawtimber volume or plurality of sapling stems are classified as this type. In most lumber and plywood products western white pine is marketed under its own name or as Idaho white pine. Some lower common grades and some shop grades are occasionally mixed with ponderosa pine *(Pinus ponderosa)*, sugar pine *(Pinus lambertiana)*, or other soft-textured pines for ease in marketing.

SUPPLY

The total present acreage occupied by western white pine is about 2,400,000 acres.

The net volume of western white pine growing stock on commercial forest lands is estimated to be about 4.3 billion cubic feet and the estimated sawtimber volume about 24 billion board feet. Approximately three fifths of this volume is in Idaho and Montana.

PRODUCTION

Western white pine lumber production has exceeded 200 million board feet annually since 1915 (fig. 4). The record production occurred in 1937, when an estimated 563 million board feet was produced. Following World War II, production levelled off at about 300 million board feet annually. Idaho has always been the leading State in western white pine lumber production. Now, it leads not only in lumber production, but also in plywood. The rapid decline in the use of wooden matches has greatly reduced demands upon this species.

The most severe threats to western white pine production are fire, insects, and diseases. Although the species is established in most instances as new growth after fire, it is only moderately fire resistant and small trees are extremely vulnerable to crown fires. The mountain pine beetle *(Dendroctonus monticolae)* is the most serious insect pest, especially in older trees. By far the most serious disease is white pine blister rust *(Cronartium ribicola)*. This introduced disease has killed countless white pine and is especially damaging to young stands. It has forced virtual suspension of serious management for western white pine, pending the development of better disease control methods and of rust-resistant planting stock. White pine pole blight, a threatening but rather poorly understood disease, appears to have been associated with previous long-term drought conditions and now seems to have diminished in importance. Root and stem rots pose only a moderate threat to western white pine.

CHARACTERISTICS AND PROPERTIES

The sapwood of western white pine is nearly white, but sometimes is pale yellowish white. Color of the

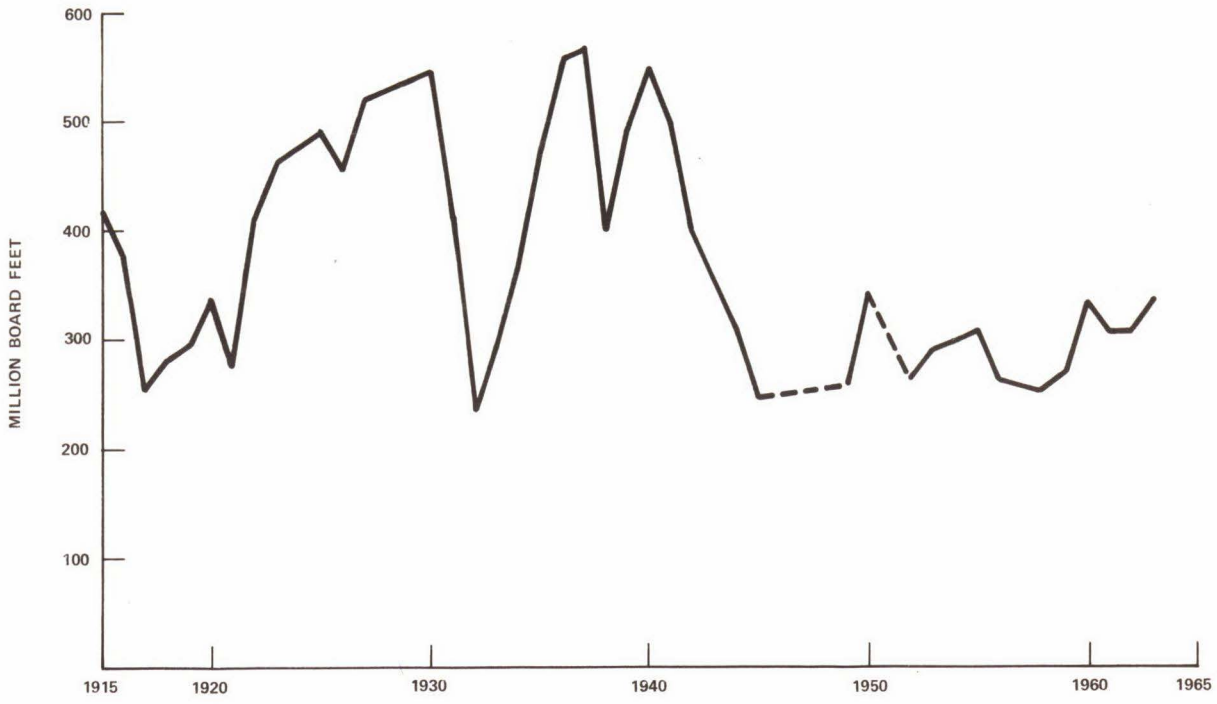


Figure 4.—Western white pine lumber production, 1915-1963.

heartwood ranges from cream to light brown or reddish brown and turns dark on exposure. The wood has the resinous odor typical of the other pines, but not the characteristic taste. The sapwood and heartwood can be classified as low to intermediate in their resistance to decay.

Western white pine is generally straight-grained, relatively light in weight, and soft. It is moderately strong in endwise compression and rather low in shock resistance. It works very well with tools, is easy to glue, and is high in its ability to hold paint. It does not split readily when nailed, but has only medium nail-holding ability. It is fairly easy to dry, shrinks moderately, and stays in place very well when properly dried. Western white pine has a density of about 28.0 pounds per cubic foot at 15-percent moisture content.

PRINCIPAL USES

Western white pine has always been a species in high demand and has carried an appropriately high price at most times. Until the wooden match was essentially replaced by the paper book match, western white pine was the principal species used. It was once used extensively for boxes and crates because of its light weight, stability, and ease of nailing. The lower grades of lumber are still used for building construction, especially wall and roof sheathing. The better lumber grades are used for interior paneling, windows, panel doors, and trim. Considerable volumes are cut into moldings. The shop and clear grades are in high demand for patterns in the foundry industry, mainly because of the high degree of dimensional stability.

Western white pine is used for softwood furniture, much of it going into unpainted Colonial period reproductions. About one-third of the annual lumber production goes into manufacturing industries. Some common-grade lumber is being used as the face for laminated roof decking.

Western white pine is now being used for softwood plywood. Rotary-cut veneer for structural uses is being manufactured by at least three factories, and sliced veneer suitable for decorative plywood by two. Residues from practically every western white pine primary manufacturing operation are used for pulp, and substantial volumes of small or defective trees are converted from round logs into chips. White pine also is used in limited quantities for particle, or flake, boards.

Western white pine grows in some of the finest western outdoor recreation areas and has considerable esthetic value. In addition, the long, distinctive cones are collected in substantial numbers for novelties or souvenirs.

REFERENCES

Gill, Thomas G., and Robert B. Phelps.
1969. Wood used in manufacturing industries, 1965. U.S. Dep. Agric. Stat. Bull. 440, 101 p., illus.

Harlow, W. M., and E. S. Harrar.
1968. Textbook of dendrology. American Forestry Series. Ed. 5, 512 p., illus. McGraw-Hill Book Co., New York.

Little, Elbert L., Jr.
1953. Checklist of native and naturalized trees of the United States (including Alaska). USDA Agric. Handb. 41, 472 p.

Panshin, A. J., Carl de Zeeuw, and H. P. Brown.
1964. Textbook of wood technology, Vol. I—Structures, identification, uses, and properties of the commercial woods of the United States. Ed. 2, 643 p., illus. McGraw-Hill Book Co., New York.

USDA Forest Products Laboratory.
1955. Wood handbook. USDA Agric. Handb. 72, 528 p., illus.

USDA Forest Products Laboratory.
1956. Wood—color and kinds. USDA Agric. Handb. 101, 36 p., illus.

USDA Forest Service.
1956. Silvics of forest trees of the United States. USDA Agric. Handb. 271, 762 p., illus.

USDA Forest Service.
1965. Timber trends in the United States. USDA For. Serv. Res. Rep. 17, 235 p., illus.

U.S. Forest Service
Pacific Southwest Library and Information Center
1323 Club Drive
Vallejo, CA 94592-1110

☆ U.S. GOVERNMENT PRINTING OFFICE: 1973 O—505-864

For sale by the Superintendent of Documents, U.S. Government Printing Office,
Washington, D.C. 20402 - Price: 25 cents
Stock Number 0101-00343